General Biology

FLORISTIC ANALYSIS OF PHLOEM LOADING TYPES

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Phloem is the structure used by plants for long distant nutrient transport from the source organs of photosynthesis (mature leaves) to areas of growth and storage. Phloem loading is the starting point for this transport involving hydrostatic pressure and pressure gradients. There are two types of phloem loading, symplastic phloem loading, through the plasmodesmata-connected cytosol of cells or apoplastic loading, which requires at least one extracellular step. It has been assumed that most plants load apoplastically, however scientists have been finding more and more symplastic phloem loaders. The most important question is why did symplastic phloem loading evolve at all? Why do we have two forms of phloem loading? Is it because of the different anatomy of the two plants or because of the different sugars the two types translocate? The obvious question to ask is simply, where do symplastic phloem loaders live? In our experiments 17 families of plants were used, of these, 10 are symplastic phloem loading families and 7 are apoplastic loading families. These symplastic families include Acanthaceae, Bignoniaceae, Buxaceae, Celastraceae, Cucurbitaceae, Juglandacaeae, Lamiacaeae, Oleaceae, Scrophulariaceae, and Verbenaceae. The apoplastic loading families include: Betulaceae, Boraginaceae, Cornaceae, Fagaceae, Gesnariaceae, Hydrophyllaceae, Myricaceae. We are interested in how many species in each family are listed in different floras around the world. Floras were chosen that are small enough to only have one type of climate. We compared how many species in each family grew in different floras with a range of climates from desert to tropical. We found that symplastic phloem loaders are most prevalent in tropical climate regions of the world.